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GAIN Report

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National Food Safety Standard-Potassium Chloride

Report Categories:

FAIRS Subject Report

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Report Highlights:

On May 5, 2010, China notified the WTO of National Food Safety Standard: Food Additives – Potassium Chloride as SPS/N/CHN/264. This measure applies to the production, circulation, supervision and management of the food additive potassium chloride. It specifies the scope, requirements and testing methods. The date for submission of final comments to China is May 20, 2010. The proposed date of entry is May 30, 2010. Contact information on where to send comments is inside the report. This report is an INFORMAL translation of this document.

Executive Summary:

On May 5, 2010, China notified the WTO of National Food Safety Standard: Food Additives – Potassium Chloride as SPS/N/CHN/264. This measure applies to the production, circulation, supervision and management of the food additive potassium chloride. It specifies the scope, requirements and testing methods. The date for submission of final comments to China is May 20, 2010. The proposed date of entry is May 30, 2010. This report is an INFORMAL translation of this document.

Comments can be sent to the China WTO SPS Enquiry Point at: SPS@aqsiq.gov.cn.

This report contains an UNOFFICIAL translation of National Standard on Determination of Potassium Chloride in Foods.

General Information:

BEGIN TRANSLATION

GB National Food Safety Standard

GB 6227.1-XXX

Food Additive - Potassium Chloride**National Food Safety Standard**

(Draft for Comment)

Issued on xx-xx-xxxx

Implemented on xx-xx-xxxx

Issued by the Ministry of Health
of the People's Republic of China

Foreword

This Standard is modified in relation to "Potassium Chloride" in the 6th edition of Food Chemicals Chemicals Codex (FCC 6) of USA.

Main technical difference between this Standard and "Potassium Chloride" in FCC 6 is as follows:

-- Mass fraction of arsenic content in this Standard is not more than 0,0002 %.

Annex A of this Standard is normative.

National Food Safety Standard Food Additive - Potassium Chloride**1 Scope**

This Standard is applicable to food additive potassium chloride refined from potassium

chloride made from halite carnallite with magnesium chloride and potassium chloride as main ingredients or sea salt

2. Normative references

Documents referenced in this Standard are indispensable for the application of this Standard. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

3 Molecular formula and relative molecular mass

Molecular formula: KCl

Relative molecular mass: 74.55 (based on 2007 International Relative Atomic Mass)

4 Technical requirements

4.1 Sense requirements

The requirements of Table 1 shall apply.

Table 1 Sense requirements

Items	Requirements	Test method
Color	Colorless or white	Place a proper amount of sample in a 50mL beaker, and observe color and structural state under natural light.
Structural state	Crystal or powder	

4.2 Physical and chemical requirements

The requirements of Table 2 shall apply.

Table 2 Physical and chemical requirements

Items	Requirements	Test method
Potassium chloride (KCl) (dry basis), w/%	≥99.0	A.4 in Annex A
Loss on drying, w/%	≤1.0	A.5 in Annex A
pH	Pass test	A.6 in Annex A
Iodine and bromine	Pass test	A.7 in Annex A
Sodium (Na), w/%	≤0.5	A.8 in Annex A
Heavy metal (based on Pb), w/ %	≤0.0005	A.9 in Annex A
Arsenic (As), w/%	≤0.0002	A.10 in Annex A

Annex A

(Normative)

Test Method

A.1 Caution

Some reagents used in the test methods of this Standard are toxic or corrosive, do be careful in operation. In case of contact with skin, rinse with water immediately, and in case of serious condition, hospitalize immediately. Use volatile acid in fume cupboard.

A.2 General requirements

Reagents and water used in this Standard, unless otherwise stated, are analytically pure reagents and grade III water specified in GB 6682-2008. Standard solution, impurity standard solution, preparations and products used in the tests of this Standard, unless otherwise stated, shall be prepared according to requirements of HG/T 3696.1, HG/T 3696.2 and HG/T 3696.3.

A.3 Identification

A.3.1 Identification of potassium ion

Weigh about 2 g of sample, place it in a beaker, and add about 10 mL of water for dissolving. Wet platinum wire of a glass rod (with a platinum wire ring on the top end) in hydrochloric acid, burn the platinum wire on flame to colorless, dip a little test solution and burn on the flame, the flame shall be purple under cobalt glass.

A.3.2 Identification of chlorine ion

Mix sample solution (A.3.1) with silver nitrate solution (10 g/L) to generate white precipitate, which is insoluble in nitric acid.

A.4 Determination of potassium chloride content

A.4.1 Method summary

See Chapter 2 of GB/T 3050-2000.

A.4.2 Reagents

A.4.2.1 Nitric acid solution: 1+1;

A.4.2.2 Saturated potassium nitrate solution;

A.4.2.3 Bromophenol blue indicator solution: 1 g/L ethanol solution;

A.4.2.4 Standard titration solution of silver nitrate: $c(\text{AgNO}_3)$, about 0.1 mol/L.

A.4.3 Apparatus and instruments

A.4.3.1 Potentiometer: accurate to 2 mV/grid, measurement range: -500 mV to +500 mV;

A.4.3.2 Reference electrode: double liquid junction saturated calomel electrode;

A.4.3.3 Measuring electrode: silver electrode.

A.4.4 Analytical procedures

Weigh about 0.25 g of sample (accurate to 0.0001 g) that has been dried for 2 h according to Article A.5, place in a 100 mL beaker, add 40 mL of water for dissolving, add one drop of bromophenol blue indicator solution, add one to two drops of nitric acid solution to change color of the solution into yellow, operate according to the procedure in 4.6 of GB/T 3050-2000 from "put into an electromagnetic stirrer..." with 0.1 mol/L standard titration solution of silver nitrate, record bulk volume and corresponding potential value after each adding of the standard titration solution of silver nitrate, and calculate volume (V) of the consumed standard titration solution of silver nitrate after titration to the end point.

A.4.5 Result calculation

Potassium chloride content is calculated according to formula (A.1) based on mass fraction w_1 of potassium chloride (KCl) and its value is expressed in %:

$$w_1 = \frac{VcM/1000}{m(1-w_0)} \dots\dots\dots (A.1)$$

where:

V--volume of the consumed standard titration solution of silver nitrate for titration, expressed in mL;

c--accurate value of concentration of the standard titration solution of silver nitrate, expressed in mol/L;

w0--value of mass fraction of loss on drying measured in Article A.5, expressed in %;

m--value of sample mass, expressed in g;

M--value of molar mass of potassium chloride (KCl), expressed in g/mol ($M=74.55$).

Arithmetic mean of parallel determination results is taken as the determination result, and absolute difference between two parallel determination results is not more than 0.2 %.

A.5 Determination of loss on drying

A.5.1 Apparatus and instruments

- A.5.1.1 Weighing bottle: $\phi 30\text{ mm} \times 25\text{ mm}$;
- A.5.1.2 Electric oven or high-temperature furnace that can be controlled in $105\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$.

A.5.2 Analytical procedures

Weight about 2 g of sample (accurate to 0.0002 g) from a weighing bottle that has been dried to constant mass at $105\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$, place the sample in the electric oven, and heat for 2 h at $105\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}$.

A.5.3 Result calculation

Loss on drying is calculated according to formula (A.2) based on mass fraction w_0 and its value is expressed in %:

$$w_0 = \frac{m_1 - m_2}{m} \times 100 \quad \dots\dots\dots(\text{A.2})$$

where:

m_1 --value of mass of the sample and the weighing bottle, expressed in g;

m_2 --value of mass of dried sample and weighing bottle, expressed in g;

m --value of mass of the sample, expressed in g.

Arithmetic mean of parallel determination results is taken as the determination result, and absolute difference between two parallel determination results is not more than 0.2 %.

A.6 pH

A.6.1 Reagents

- A.6.1.1 Carbon dioxide-free water;
- A.6.1.2 Standard titration solution of sodium hydroxide: $c(\text{NaOH})$, about 0.02 mol/L;
- A.6.1.3 Phenolphthalein indicator solution.

A.6.2 Analytical procedures

Weigh about 5 g of sample, dissolve in 50 mL of freshly prepared carbon dioxide-free water, add three drops of phenolphthalein indicator solution, and color of the solution shall not develop pink. The test solution shall develop pink after adding 0.3 mL of standard titration solution of sodium hydroxide dropwise.

A.7 Determination of iodine and bromine

A.7.1 Reagents

- A.7.1.1 Trichloromethane;
- A.7.1.2 Sodium hypochlorite solution.

A.7.2 Analytical procedures

Weigh 2 g of sample (accurate to 0.01 g), place in a 25 mL colorimetric tube, add 6 mL of water, and dissolve. Add 1 mL of trichloromethane, shake the colorimetric tube while adding 5 mL of sodium hypochlorite solution dropwise. The trichloromethane layer shall not develop temporary purple or permanent orange.

A.8 Determination of sodium (Na) content

A.8.1 Reagents

- A.8.1.1 hydrochloric acid: guaranteed reagent;
- A.8.1.2 Stock solution of sodium standard solution: 1 mL of solution contains 0.1 mg of sodium;

Preparation: pipette 10 mL of sodium standard solution prepared according to HG/T 3696.2 to a 100 mL volumetric flask, dilute to volume, and shake up.

- A.8.1.3 Sodium standard solution: 1 mL of solution contains 0.01 mg of sodium;

Preparation: pipette 10 mL of stock solution (A.8.1.2) of sodium standard solution to a 100 mL volumetric flask, dilute to volume, and shake up.

A.8.1.4 Cesium chloride solution: 20 g/L;

Weigh 2g of cesium chloride (spectroscopically pure), place in a 100 mL beaker, add a proper amount of water to thoroughly dissolve cesium chloride, dilute with water to 100 mL, shake up and store in a plastic bottle.

A.8.1.5 Acetylene: highly pure;

A.8.1.6 Water: grade II water in accordance with GB/T 6682-2008.

A.8.2 Apparatus and instruments

Atomic absorption spectrophotometer: equipped with sodium hollow cathode lamp.

A.8.3 Analytical procedures

A.8.3.1 Preparation of sample solution

Weigh 0.2 g of sample (accurate to 0.001 g), place in a beaker, dissolve in water, completely transfer to a 250 mL volumetric flask, dilute to volume, and shake up. Transfer 10 mL of sample solution to a 100 mL volumetric flask, add 2 mL of hydrochloric acid and 2.5 mL of cesium chloride solution, dilute to volume, shake up, and determine absorbance of the sample solution by the atomic absorption spectrophotometer.

Meanwhile, prepare the blank test solution. Except that no sample is added, other operations and types and quantity of reagents are the same as preparation of the sample solution.

A.8.3.2 Drawing of working curve

Transfer sodium standard solution to five 100 mL volumetric flasks according to Table A.1 respectively, add 2 mL of hydrochloric acid and 2.5 mL of cesium chloride solution respectively, dilute to volume, and shake up. Determine absorbance of the solution by the atomic absorption spectrophotometer, subtract absorbance of the reagent blank solution from that of standard reference solution, and draw the working curve with mass (mg) of sodium in the standard reference solution as abscissa and corresponding absorbance as ordinate.

Table A.1 Working curve of sodium

Volumetric flask No.	1	2	3	4	5
Volume of sodium standard solution (mL)	0	1.00	2.00	3.00	4.00
Mass of sodium in sodium reference solution (mg)	0	0.010	0.020	0.030	0.040

A.8.4 Result calculation

Sodium content is calculated according to formula (A.3) based on mass fraction w_2 of sodium and its value is expressed in %:

$$w_2 = \frac{m_1 - m_0}{m \times \frac{10}{250}} \times 10^{-3} \times 100 \quad \dots\dots\dots (A.3)$$

where:

m_1 --value of mass of sodium in sample solution obtained from the working curve, expressed in mg;

m_0 --value of mass of sodium in blank solution obtained from the working curve, expressed in mg;

m --value of sample mass, expressed in g.

Arithmetic mean of parallel determination results is taken as the determination result, and absolute difference between two parallel determination results is not more than 0.0002 %.

A.9 Determination of heavy metal content

Weigh 2.00 g \pm 0.01 g of sample, place in a 250 mL beaker, add 20 mL of water and 1 mL of

hydrochloric acid, boil for 15 min, cool to room temperature, and completely transfer to a 50mL colorimetric tube for use.

Standard colorimetric solution: add 20 mL of water and 1 mL of hydrochloric acid to a 250 mL beaker, boil for 15 min, cool to room temperature, and completely transfer to a 50 mL colorimetric tube, and add 1 mL of standard lead solution [1 mL of solution contains 0,01 mg of Pb] by a pipette for use.

Then, operate in accordance with Chapter 6 of GB/T 5009.74-2002.

A.10 Determination of arsenic content

Weigh $1.00\text{ g} \pm 0.01\text{ g}$ of sample, place in a conical flask, wet by water, neutralize by hydrochloric acid to neutrality (test with pH paper), adding another 5 mL, and shake up.

Transfer 2 mL of standard arsenic solution [1 mL of solution contains $1\text{ }\mu\text{g}$ of arsenic] with a pipette as standard solution, and place in another conical flask. Add 5 mL of hydrochloric acid solution (1+3) respectively, and then operate according to 6.2 limit test of method 1: Silver diethyldithiocarbamate colorimetric method in GB/T 5009.76-2003 or according to 11 determination of method 2: arsenic stain method in GB/T 5009.76-2003.

Silver diethyldithiocarbamate colorimetric method is the arbitrary method.

END TRANSLATION